



Electrical Engineering Colloquium
Dallas Chapter of IEEE Signal Processing Society Presents

Distributed Estimation Using Wireless Sensor Networks

Professor Georgios Giannakis
University of Minnesota
IEEE Signal Processing Society Distinguished Lecturer

Monday, September 17, 2007
ECSS 2.102 (TI Auditorium), 11:00am

Envisioned applications of wireless sensor networks (WSNs) include surveillance, monitoring and tracking tasks. These motivate well decentralized estimation and smoothing of deterministic and (non)stationary random signals using (possibly correlated) observations collected across distributed sensors. In this talk we present state-of-the-art algorithms for consensus-based distributed estimation using ad hoc WSNs where sensors communicate over single-hop noisy links. The novel framework reformulates basic estimation criteria such as least-squares, maximum-likelihood, maximum a posteriori, and linear mean-square error, as decomposable, constrained, convex optimization problems that are amenable to distributed solutions. The resultant distributed estimators are provably convergent to their centralized counterparts and robust to communication noise. Besides stationary, the framework encompasses prediction, estimation and smoothing of non-stationary signals through distributed Kalman filtering.

Georgios B. Giannakis received his Ph.D. in Electrical Engineering in 1986 from the Univ. of Southern California. Since 1999 he has been a professor with the Department of Electrical and Computer Engineering at the University of Minnesota, where he now holds an Endowed ADC Chair in Wireless Telecommunications. His general interests span the areas of communications, networking, signal processing, estimation and detection theory -- subjects on which he has published more than 250 journal papers, 450 conference papers, two research monographs and two edited books. Current research focuses on wireless networks, complex-field and space-time coding, ultra-wideband and cognitive radios, cross-layer designs and wireless sensor networks. He is the (co-) recipient of six best paper awards from the IEEE Signal Processing and Communications Societies (1992, 1998, 2000, 2001, 2003, 2004) and also received the IEEE Signal Processing Society's Technical Achievement Award in 2000 as well as the EURASIP Technical Achievement Award in 2005. He is an IEEE Fellow since 1997 and has served the IEEE in various editorial and organizational posts.

For more information on the Dallas Chapter and directions to UTD, please refer to
<http://www.utdallas.edu/~kehtar/ieee-sp>